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## RAW SEQUENCE LISTING

DATE: 07/30/2002 P.6

PATENT APPLICATION: US/10/090,049

TIME: 16:15:54

Input Set : A:\NIH133SEQLIST.TXT

Output Set: N:\CRF3\07302002\J090049.raw

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4 <110> APPLICANT: Luyten, Frank P.
5      Moos, Malcolm
6      Hoang, Bang
7      Wang, Shouwen
12 <120> TITLE OF INVENTION: ISOLATION AND METHOD OF USING TISSUE
13      GROWTH-INDUCING FRZB PROTEIN
16 <130> FILE REFERENCE: NIH133.1CP1C2
18 <140> CURRENT APPLICATION NUMBER: US 10/090,049
19 <141> CURRENT FILING DATE: 2002-02-28
21 <150> PRIOR APPLICATION NUMBER: US 09/289,268
22 <151> PRIOR FILING DATE: 1999-04-09
24 <150> PRIOR APPLICATION NUMBER: PCT/US97/18362
25 <151> PRIOR FILING DATE: 1997-10-08
27 <150> PRIOR APPLICATION NUMBER: US 08/822,333
28 <151> PRIOR FILING DATE: 1997-03-20
30 <150> PRIOR APPLICATION NUMBER: US 08/729,452
31 <151> PRIOR FILING DATE: 1996-10-11
33 <160> NUMBER OF SEQ ID NOS: 23
35 <170> SOFTWARE: FastSEQ for Windows Version 4.0
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38 <211> LENGTH: 2374
39 <212> TYPE: DNA
40 <213> ORGANISM: Bos Taurus
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44 gcggcgggcg ctggcgctcg gcgcagcttt tgggaccca ttgagggaat ttgatccaag 120
45 gaagctgtga gattgccggg ggaggagaag ctcccatatc attgtgtcca cttccagggc 180
46 ggggaggagg aaacggcgga gcgggcctct cggcgttctc cgcactgctg caccctgccc 240
47 catcctgccg agatcatggt ctgcgggagc cgaggcgga tgctgctgct gccggccggg 300
48 ctactcgccc tggctgcgct ctgcctgctc cgcgtgcccg gagecggggc ggccgcctgt 360
49 gagcccgttc gcattcccct gtgcaagtcc ctgccctgga acatgactaa gatgcccaac 420
50 cacctgcacc acagcaccca ggccaacgcc atcctggcca tcgagcagtt cgaaggtctg 480
51 ctgggacccc actgcagccc ggatctgctc ttcttctct gtgctatgta cgcgcccata 540
52 tgcaaccattg acttccagca cgagcccatc aagccctgca agtctgtgtg cgagcgggcc 600
53 cggcagggct gtgagcccat cctcatcaag taccgccact cgtggccgga aagcctggcc 660
54 tgcgaggagc tgccagtata tgaccgcggc gtgtgcatct ctccggaggc catcgtaact 720
55 gccgacggag ccgattttcc tatggattcc agtaatggaa actgtagagg agcaagcagt 780
56 gaacgctgca aatgtaaacc agtcagagct acacagaaga cctatttccg aaacaattac 840
57 aactatgtca ttcgggctaa agttaagaa ataaagacca agtgatcatga tgtgactgca 900
58 gtagtgaggg tgaaggagat tttaaaggct tctctggtaa acattccaag ggaaactgtg 960
59 aacctttata ccagctctgg ctgcctgtgt cctccactta acgttaatga ggagtatctc 1020
60 atcatgggct acgaagatga agagcgctcc agattactgt tggtagaagg ttctattgct 1080
61 gagaaatgga aggatcgact tggtaaaaaa gttaagcggg gggatatgaa gctccgtcat 1140

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62 cttggactga atacaagtga ttctagccat agtgattcca ctcagagtca gaagcctggc 1200
63 aggaattcta actcccggca agcacgcaac taaatcctga aatgcagaaa atcctcagtg 1260
64 gacttcctat taagacttgc attgctggac tagcaaaggc aaattgcaact attgcacgtc 1320
65 atagtctatt ttttagccac aaaaatcagg tggttaactga tattacttct attttttctt 1380
66 ttgttttctg cttttctcct tcccccttcc ccttttttgt ggtctgagta cagatcctta 1440
67 aatataattat atgtattcta ttctactaat catgggaaaa ctgttctttg caataataat 1500
68 aaattaaaca tgttgatacc agggcctctt tgctggagta aatgttaatt tgctgttctg 1560
69 caccagatt gggaatgcaa tattggatgc aaagagagat ttctggtata cagagaaagc 1620
70 tagataggct gtaaagcata ctttgctgat ctaattacag cctcattctt gcatgccttt 1680
71 tggcattctc ctcacgctta gaaagttcta aatgtttata aaggtaaaat gacagtttga 1740
72 aatcaaatgc caacaggcag agcaatcaag caccaggaag catttatgaa gaaatgacac 1800
73 atgagatgaa ttatttgcaa gattggcagg aagcaaaata aatagcatta ggagctggg 1860
74 atagagcatt ttgcctgact gagaagcaca actgaagcta gtagctgttg ggggtgttaac 1920
75 agcagcattt ttcttttgac gatacatttg tttgtctgtg aatatattga tcagcattag 1980
76 agcagtggat tgtgaccaga catcagggtg tatcagcata gctctgttta atttgcttcc 2040
77 ttttagatga acgcattggg gtcttttttt tcttctttta aaataaatct cccttgctgc 2100
78 atttgaccag gaaaagaaag catatatgca tgtgcaccgg gctgttattt ttaagatatg 2160
79 tagctctata aaacgctata gtcaaaagat ggtaaaatgt gcaagattct ggggtgtgtg 2220
80 attaatgtgt gtgtgtccgc atacactcac actcaagctg aagtgaacga caggcctgtg 2280
81 cactggcctg cactttatca tttggatttg tgctgtttaa tgctcagtaa aatatgctta 2340
82 ataaaaggaa aaaaaaaaaa aaaaaaaaaa aaaa 2374

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84 &lt;210&gt; SEQ ID NO: 2

85 &lt;211&gt; LENGTH: 325

86 &lt;212&gt; TYPE: PRT

87 &lt;213&gt; ORGANISM: Bos Taurus

89 &lt;400&gt; SEQUENCE: 2

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90 Met Val Cys Gly Ser Arg Gly Gly Met Leu Leu Pro Ala Gly Leu
91 1 5 10 15
92 Leu Ala Leu Ala Ala Leu Cys Leu Leu Arg Val Pro Gly Ala Arg Ala
93 20 25 30
94 Ala Ala Cys Glu Pro Val Arg Ile Pro Leu Cys Lys Ser Leu Pro Trp
95 35 40 45
96 Asn Met Thr Lys Met Pro Asn His Leu His His Ser Thr Gln Ala Asn
97 50 55 60
98 Ala Ile Leu Ala Ile Glu Gln Phe Glu Gly Leu Leu Gly Thr His Cys
99 65 70 75 80
100 Ser Pro Asp Leu Leu Phe Phe Leu Cys Ala Met Tyr Ala Pro Ile Cys
101 85 90 95
102 Thr Ile Asp Phe Gln His Glu Pro Ile Lys Pro Cys Lys Ser Val Cys
103 100 105 110
104 Glu Arg Ala Arg Gln Gly Cys Glu Pro Ile Leu Ile Lys Tyr Arg His
105 115 120 125
106 Ser Trp Pro Glu Ser Leu Ala Cys Glu Glu Leu Pro Val Tyr Asp Arg
107 130 135 140
108 Gly Val Cys Ile Ser Pro Glu Ala Ile Val Thr Ala Asp Gly Ala Asp
109 145 150 155 160
110 Phe Pro Met Asp Ser Ser Asn Gly Asn Cys Arg Gly Ala Ser Ser Glu
111 165 170 175
112 Arg Cys Lys Cys Lys Pro Val Arg Ala Thr Gln Lys Thr Tyr Phe Arg

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113          180          185          190
114 Asn Asn Tyr Asn Tyr Val Ile Arg Ala Lys Val Lys Glu Ile Lys Thr
115          195          200          205
116 Lys Cys His Asp Val Thr Ala Val Val Glu Val Lys Glu Ile Leu Lys
117          210          215          220
118 Ala Ser Leu Val Asn Ile Pro Arg Glu Thr Val Asn Leu Tyr Thr Ser
119 225          230          235          240
120 Ser Gly Cys Leu Cys Pro Pro Leu Asn Val Asn Glu Glu Tyr Leu Ile
121          245          250          255
122 Met Gly Tyr Glu Asp Glu Glu Arg Ser Arg Leu Leu Leu Val Glu Gly
123          260          265          270
124 Ser Ile Ala Glu Lys Trp Lys Asp Arg Leu Gly Lys Lys Val Lys Arg
125          275          280          285
126 Trp Asp Met Lys Leu Arg His Leu Gly Leu Asn Thr Ser Asp Ser Ser
127          290          295          300
128 His Ser Asp Ser Thr Gln Ser Gln Lys Pro Gly Arg Asn Ser Asn Ser
129 305          310          315          320
130 Arg Gln Ala Arg Asn
131          325
134 <210> SEQ ID NO: 3
135 <211> LENGTH: 1484
136 <212> TYPE: DNA
137 <213> ORGANISM: Homo Sapiens
139 <400> SEQUENCE: 3
140 cggggcctgg gcggsagggg cggtggtcgg agctcggtaa agctcgtggg accccattgg 60
141 gggaatttga tccaaggaag cggtgattgc cgggggagga gaagctccca gatccttggt 120
142 tccacttgca gcgggggagg cgggacgcg gagcgggcct tttggcgctc actgcgcggc 180
143 tgcacctgca cccatcctgc cgggatcatg gtctgcggca gcccgggagg gatgctgctg 240
144 ctgcgggccc ggctgcttgc cctggctgct ctctgcctgc tccgggtgcc cggggctcgg 300
145 gctgcagcct gtgagcccggt ccgcaccccc ctgtgcaagt cccctgccctg gaacatgact 360
146 aagatgcccc accacctgca ccacagcact caggccaacg ccacccctggc catcgagcag 420
147 ttcgaaggctc tgctggggcac ccactgcagc cccgatctgc tcttcttctc ctgtgccatg 480
148 tacgcgcccc tctgcacccat tgacttccag cagagcccc tcaagccctg taagtctgtg 540
149 tgcgagcggg cccggcaggg ctgtgagccc atactcatca agtaccgcca ctctgtggcg 600
150 gagaacctgg cctgcgagga gctgccagtg tacgacaggg gcgtgtgcat ctctcccag 660
151 gccatcgtaa ctgcggacgg agctgatttt cctatggatt ctagtacagg aaactgtaga 720
152 ggggcaagca gtgaacgctg taaatgtaag cctattagag ctacacagaa gacctatttc 780
153 cggaacaatt acaactatgt cattcgggct aaagttaaag agataaagac taagtgccat 840
154 gatgtgactg cagtagtgga ggtgaaggag attctaaagt cctctctggt aaacattcca 900
155 cgggacactg tcaacctcta taccagctct ggctgcctct gccctccact taatgttaat 960
156 gaggaatata tcatcatggg ctatgaagat gaggaacggt ccagattact cttggtggaa 1020
157 ggctctatag ctgagaagtg gaaggatcga ctcggtaaaa aagttaagcg ctgggatatg 1080
158 aagcttcgtc atcttggaact cagtaaaagt gattctagca atagtgattc cactcagagt 1140
159 cagaagtctg gcaggaactc gaacccccgg caagcacgca actaaatccc gaaatacaaa 1200
160 aagtaacaca gtggacttcc tattaagact tacttgcat tctggactag caaaggaaaa 1260
161 ttgactattt gcacatcata ttctattgtt tactataaaa atcatgtgat aactgattat 1320
162 tacttctgtt tctcttttgg tttctgcttc tctcttctct caacccttt gtaatggttt 1380
163 gggggcagac tcttaagtat attgtgagtt ttctatttca ctaatcatga gaaaaactgt 1440
164 tcttttgcaa taataataaa ttaaacatgc tggtaaaaaa aaaa          1484

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166 <210> SEQ ID NO: 4
167 <211> LENGTH: 325
168 <212> TYPE: PRT
169 <213> ORGANISM: Homo Sapiens
171 <400> SEQUENCE: 4
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174 Leu Ala Leu Ala Ala Leu Cys Leu Leu Arg Val Pro Gly Ala Arg Ala
175 20 25 30
176 Ala Ala Cys Glu Pro Val Arg Ile Pro Leu Cys Lys Ser Leu Pro Trp
177 35 40 45
178 Asn Met Thr Lys Met Pro Asn His Leu His His Ser Thr Gln Ala Asn
179 50 55 60
180 Ala Ile Leu Ala Ile Glu Gln Phe Glu Gly Leu Leu Gly Thr His Cys
181 65 70 75 80
182 Ser Pro Asp Leu Leu Phe Phe Leu Cys Ala Met Tyr Ala Pro Ile Cys
183 85 90 95
184 Thr Ile Asp Phe Gln His Glu Pro Ile Lys Pro Cys Lys Ser Val Cys
185 100 105 110
186 Glu Arg Ala Arg Gln Gly Cys Glu Pro Ile Leu Ile Lys Tyr Arg His
187 115 120 125
188 Ser Trp Pro Glu Asn Leu Ala Cys Glu Glu Leu Pro Val Tyr Asp Arg
189 130 135 140
190 Gly Val Cys Ile Ser Pro Glu Ala Ile Val Thr Ala Asp Gly Ala Asp
191 145 150 155 160
192 Phe Pro Met Asp Ser Ser Asn Gly Asn Cys Arg Gly Ala Ser Ser Glu
193 165 170 175
194 Arg Cys Lys Cys Lys Pro Ile Arg Ala Thr Gln Lys Thr Tyr Phe Arg
195 180 185 190
196 Asn Asn Tyr Asn Tyr Val Ile Arg Ala Lys Val Lys Glu Ile Lys Thr
197 195 200 205
198 Lys Cys His Asp Val Thr Ala Val Val Glu Val Lys Glu Ile Leu Lys
199 210 215 220
200 Ser Ser Leu Val Asn Ile Pro Arg Asp Thr Val Asn Leu Tyr Thr Ser
201 225 230 235 240
202 Ser Gly Cys Leu Cys Pro Pro Leu Asn Val Asn Glu Glu Tyr Ile Ile
203 245 250 255
204 Met Gly Tyr Glu Asp Glu Glu Arg Ser Arg Leu Leu Leu Val Glu Gly
205 260 265 270
206 Ser Ile Ala Glu Lys Trp Lys Asp Arg Leu Gly Lys Lys Val Lys Arg
207 275 280 285
208 Trp Asp Met Lys Leu Arg His Leu Gly Leu Ser Lys Ser Asp Ser Ser
209 290 295 300
210 Asn Ser Asp Ser Thr Gln Ser Gln Lys Ser Gly Arg Asn Ser Asn Pro
211 305 310 315 320
212 Arg Gln Ala Arg Asn
213 325
216 <210> SEQ ID NO: 5
217 <211> LENGTH: 111

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## RAW SEQUENCE LISTING

DATE: 07/30/2002

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TIME: 16:15:54

Input Set : A:\NIH133SEQLIST.TXT

Output Set: N:\CRF3\07302002\J090049.raw

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218 <212> TYPE: PRT
219 <213> ORGANISM: Rattus
221 <400> SEQUENCE: 5
222 Cys Gln Pro Ile Ser Ile Pro Leu Cys Thr Asp Ile Ala Tyr Asn Gln
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224 Thr Ile Met Pro Asn Leu Leu Gly His Thr Asn Gln Glu Asp Ala Gly
225 20 25 30
226 Leu Glu Val His Gln Phe Tyr Pro Leu Val Lys Val Gln Cys Ser Ala
227 35 40 45
228 Glu Leu Lys Phe Phe Leu Cys Ser Met Tyr Ala Pro Val Cys Thr Val
229 50 55 60
230 Leu Glu Gln Ala Leu Pro Pro Cys Arg Ser Leu Cys Glu Arg Ala Gln
231 65 70 75 80
232 Gly Cys Glu Ala Leu Met Asn Lys Phe Gly Phe Gln Trp Pro Asp Thr
233 85 90 95
234 Leu Lys Cys Glu Lys Phe Pro Val His Gly Arg Gly Glu Leu Cys
235 100 105 110
238 <210> SEQ ID NO: 6
239 <211> LENGTH: 111
240 <212> TYPE: PRT
241 <213> ORGANISM: Drosophila
243 <400> SEQUENCE: 6
244 Cys Glu Pro Ile Thr Ile Ser Ile Cys Lys Asn Ile Pro Tyr Asn Met
245 1 5 10 15
246 Thr Ile Met Pro Asn Leu Ile Gly His Thr Lys Gln Glu Glu Ala Gly
247 20 25 30
248 Leu Glu Val His Gln Phe Ala Pro Leu Val Lys Ile Gly Cys Ser Asp
249 35 40 45
250 Asp Leu Gln Leu Phe Leu Cys Ser Leu Tyr Val Pro Val Cys Thr Ile
251 50 55 60
252 Leu Glu Arg Pro Ile Pro Pro Cys Arg Ser Leu Cys Glu Ser Ala Arg
253 65 70 75 80
254 Val Cys Glu Lys Leu Met Lys Thr Tyr Asn Phe Asn Trp Pro Glu Asn
255 85 90 95
256 Leu Glu Cys Ser Lys Phe Pro Val His Gly Gly Glu Asp Leu Cys
257 100 105 110
260 <210> SEQ ID NO: 7
261 <211> LENGTH: 319
262 <212> TYPE: PRT
263 <213> ORGANISM: Xenopus
265 <400> SEQUENCE: 7
266 Met Ser Pro Thr Arg Lys Leu Asp Ser Phe Leu Leu Leu Val Ile Pro
267 1 5 10 15
268 Gly Leu Val Leu Leu Leu Pro Asn Ala Tyr Cys Ala Ser Cys Glu
269 20 25 30
270 Pro Val Arg Ile Pro Met Cys Lys Ser Met Pro Trp Asn Met Thr Lys
271 35 40 45
272 Met Pro Asn His Leu His His Ser Thr Gln Ala Asn Ala Ile Leu Ala
273 50 55 60

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RAW SEQUENCE LISTING ERROR SUMMARY  
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Input Set : A:\NIH133SEQLIST.TXT  
Output Set: N:\CRF3\07302002\J090049.raw

Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:10; N Pos. 21  
Seq#:11; N Pos. 10,16  
Seq#:12; Xaa Pos. 13

## VERIFICATION SUMMARY

DATE: 07/30/2002

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Input Set : A:\NIH133SEQLIST.TXT

Output Set: N:\CRF3\07302002\J090049.raw

L:382 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!  
L:391 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:10  
L:392 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:10 after pos.:0  
L:402 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!  
L:408 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:11  
L:409 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:11 after pos.:0  
L:419 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!  
L:423 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:12  
L:424 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:12 after pos.:0